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ABSTRACT

A growing number of states are implementing standards-based accountability systems in their efforts to improve student achievement. Policymakers in these states believe that standards-based reforms that include high-stakes testing can be powerful tools to change what is happening in schools and classrooms. This study is part of ongoing research funded by the National Center for Research on Evaluation, Standards, and Student Testing at the University of California, Los Angeles, to investigate the impact of standards-based state education reforms on schools and classrooms. Researchers from RAND and the University of Colorado, Boulder, began this program of research in 1995-96 with an examination of the effects of standards-based education reform in Kentucky, which was one of the earliest in the country, including new performance standards for students and a new statewide-testing system. After studying the effects of the Kentucky reform for 3 years, researchers shifted their attention to Washington State, which was just beginning to implement standards-based reform. Research activities began in Washington in 1998-99 and continued through 1999-00. This briefing summarizes results from the 1999 survey of teachers and students. (DFR)

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RAND Education

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The Effects of the Washington State Education Reform on Schools and Classrooms: Initial Findings

Brian M. Stecher, Tammi Chun, Sheila Barron, Karen Ross

Supported by the Office of Educational Research and Improvement, U.S. Department of Education

RAND Education

Preface

RAND

A growing number of states are implementing standards-based accountability systems in efforts to improve student achievement. Policymakers in these states believe that standards-based reforms that include high-stakes testing can be powerful tools to change what is happening in schools and classrooms. This study is part of ongoing research funded by the National Center for Research on Evaluation, Standards, and Student Testing (CRESST) at the University of California, Los Angeles (UCLA) to understand the impact of standards-based state education reforms on schools and classrooms.

Researchers from RAND and the University of Colorado (CU)-Boulder began this program of research in 1995–96 with an examination of the effects of standards-based education reform in Kentucky. Kentucky's reform, which was one of the earliest in the country, included new performance standards for students and a new statewide testing system. The testing system, called the Kentucky Instructional Results Information System (KIRIS), was exclusively performance-based, including mathematics and writing portfolios as well as other open-response tasks. The education reform also had a strong accountability component;

schools showing adequate improvement were given cash awards, and schools whose scores declined were declared "in crisis," provided with assistance, and if they continued in crisis for an extended period, threatened with reorganization.

After studying the effects of the Kentucky reform for three years, the researchers shifted their attention to Washington, a state that was just beginning to implement standards-based reform. Washington provided a number of interesting contrasts with Kentucky. For example, Washington chose to implement changes gradually over a period of a decade rather than all at once. Also, because of a strong tradition of local control, the Washington reform left more responsibility for implementation, particularly for professional development, in the hands of local districts. Research activities began in Washington in 1998–1999 and will continue through 1999–2000. This briefing summarizes results from the 1999 survey of teachers and students. The full report is available from the National Center for Research on Evaluation, Standards, and Student Testing (CRESST) at UCLA: http://www.cse.ucla.edu/.[1]

An electronic version of the slides in this briefing is available on the web site of Washington state's Office of the Superintendent of Public Instruction: http://www.k12.wa.us/puborder/order.asp.

[1]B.M. Stecher, S.L. Barron, T. Chun, and K. Ross (in press). *The Effects of Washington State Education Reform on Schools and Classrooms.* CSE Technical Report 525. Los Angeles, CA: UCLA Center for the Study of Evaluation.

Acknowledgments

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Many people contributed to this research effort, and we would like to acknowledge their efforts. We are indebted to hundreds of Washington principals and teachers, who contributed their time to complete our surveys. We also want to express our gratitude to Dr. Terry Bergeson, Washington Superintendent of Public Instruction, and to her staff for their support and assistance. In particular, Shirley McCune, Ed Strozyk, and Enrico Yap supported this work and provided important data and assistance. Edie Harding, Washington State Institute of Public Policy, and Pete Bylsma, Office of the Superintendent of Public Instruction, provided helpful comments on the draft of this report.

At RAND, our colleague Cathy Krop was instrumental in developing the surveys. Melissa Bradley and Kathryn Davis coordinated survey sampling, data collection, and data preparation. They were assisted by Mary Alhm, Carole Berkson, Linda Daly, Cassandra Frankos, Jo Levy, J. D. Lieber, Raylette Pickett, and Laura Quintero. Donna White helped in the preparation of this document. Gail Zellman reviewed the document.

The Effects of the Washington State Education Reform on Schools and Classrooms

Brian Stecher, Sheila Barron,
Tammi Chun, Karen Ross
RAND

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Researchers from RAND are studying the implementation and impact of the Washington reform on school and classroom practices, focusing on the subjects of writing and mathematics. This briefing presents findings from the first round of surveys administered to teachers and principals in the spring of 1999. At this time, elementary schools had already administered the Washington Assessment of Student Learning (WASL) for two years (voluntary in 1996–97 and mandatory in 1997–98) and middle schools had administered the test for one year (voluntary in 1997–98). Thus, the results describe principals' and teachers' early responses to the state education reform. The findings are based on principal and teacher self-reports about actions taken in their districts, schools, and classrooms, as well as their opinions about the reform.

Washington Took a Gradual Approach to Standards-Based Reform

- Education Reform Act passed (1993)
- Standards adopted
  - Reading, writing, mathematics, and listening (1995)
  - Social studies, science, arts, and health/fitness (1996)
- Reading, writing, mathematics, and listening tests administered
  - Grade 4: voluntary 1997; mandatory 1998
  - Grade 7: voluntary 1998; mandatory 2000
- Accountability system scheduled to be adopted (2000)
- Social studies, science, arts, and health/fitness assessments scheduled to be introduced (2001-08)

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In 1993, the Washington state legislature passed the Student Learning and Improvement Act, which is referred to as the Education Reform Act. The legislation created a standards-based reform system, including statewide standards for what students should know and be able to do in six subjects, called the Essential Academic Learning Requirements (EALRs); tests to evaluate student knowledge and progress toward standards, called the Washington Assessment of Student Learning (WASL); and an as-yet-to-be-developed mechanism to hold schools accountable for student performance.

Washington policymakers have adopted a gradual approach to implement standards-based reform. Unlike many states—including Texas, Kentucky, and North Carolina—that implemented standards-based reforms rapidly, Washington is introducing its reform over a period of a decade. For example, the EALRs for reading, writing, mathematics, and listening were developed first in 1995. The EALRs for science, social studies, health/fitness, and the arts followed in 1996. The assessments were developed next, and their full implementation will take almost a decade. The fourth grade WASL in reading, writing, mathematics, and listening was offered for the first time on a voluntary basis in 1996–97, and it became mandatory the following school year. For seventh grade students, the assessments were

voluntary in 1997-98, and will be mandatory in the 2000-01 school year. The complete assessment system will be fully implemented by 2008.

Additionally, the legislature provided funds for professional development, which supported small discretionary grants to schools and to 16 Regional Learning and Assessment Centers around the state. These centers offered training on the reform. The Commission on Student Learning, which was responsible for developing the reform components, provided materials—such as Example Tests and Assessment Tool Kits for classroom-based assessment—to help teachers understand the reform.

Initial WASL Scores Were Low, But There Have Been Some Increases

Subject	Fourth grade			Seventh grade*		
	1997	1998	1999	1997	1998	1999
Mathematics	21	31	37	-	20	24
Reading	48	56	59	-	38	41
Writing	43	37	33	-	31	37
Listening	62	71	71	-	80	87

*Grade 7 WASL was introduced in 1998 on a voluntary basis.

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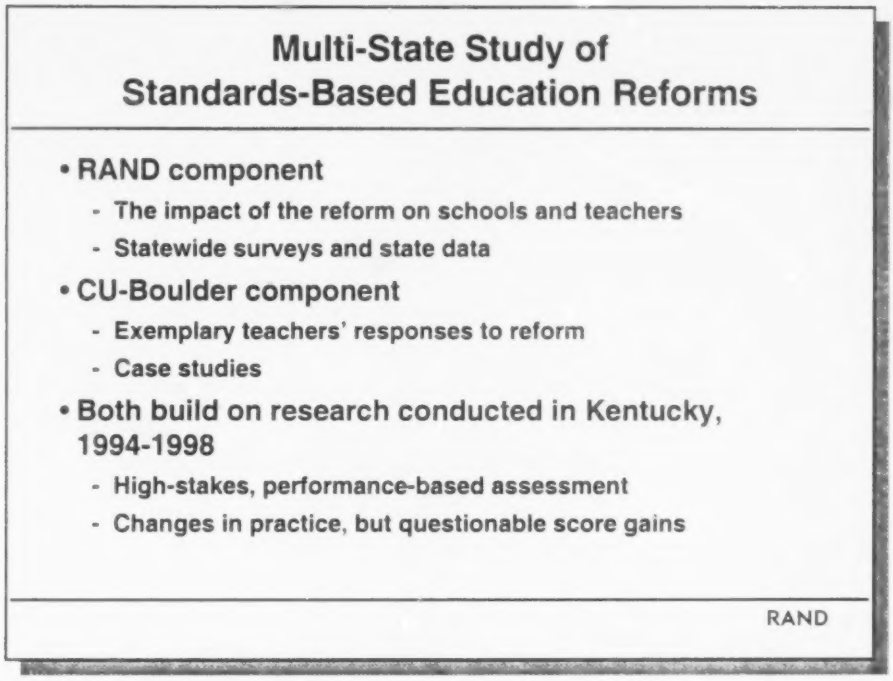
The early results from the WASL showed that only a minority of students achieved the rigorous standards embodied in the state reform; this is similar to the results of standards-based tests in other states. In Washington, fewer than one-quarter of the students met the standards in mathematics in the first year that WASL was administered. Fewer than one-half met the standards in reading or writing. Districts and schools felt strong pressure to do something to raise the scores after the first round of testing. The most recent WASL results were more encouraging, showing gains in the percentage of students meeting the standards in mathematics, reading, and listening in elementary and middle schools.


Multi-State Study of
Standards-Based Education Reforms
• RAND component
- The impact of the reform on schools and teachers
- Statewide surveys and state data
• CU-Boulder component
- Exemplary teachers' responses to reform
- Case studies
• Both build on research conducted in Kentucky, 1994-1998
- High-stakes, performance-based assessment
- Changes in practice, but questionable score gains
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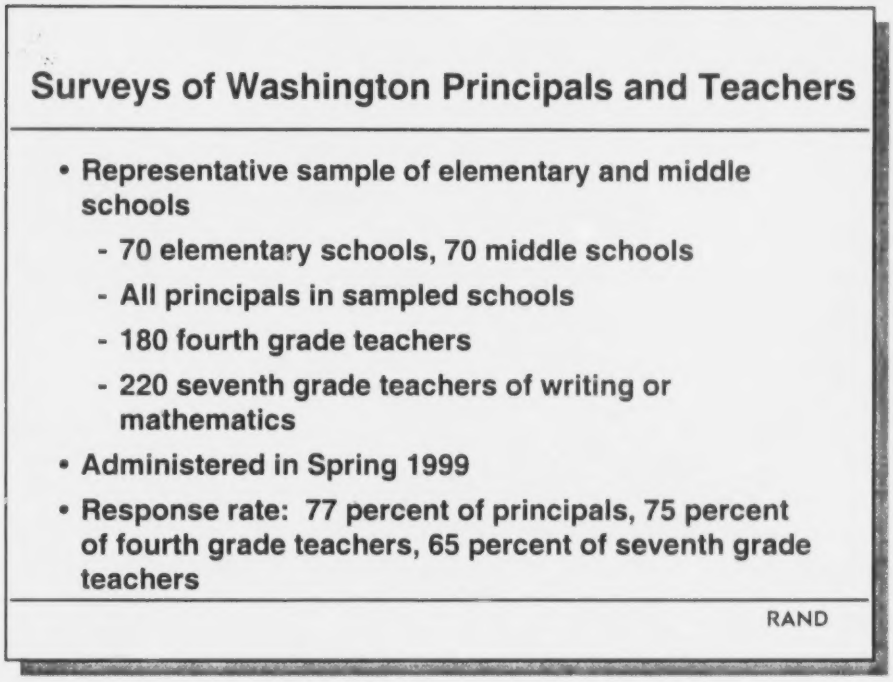
RAND and CU-Boulder are partners in this research effort. RAND researchers are examining the impact of reform on schools and classrooms through statewide surveys of principals and teachers and through analysis of state data (e.g., test results and demographic data). CU-Boulder researchers are conducting case studies of exemplary elementary and middle school writing and mathematics teachers to understand their response to reform.

Prior research in Kentucky indicates that standards-based reforms that include high-stakes testing can be powerful tools to change what is happening in schools and classrooms. The Kentucky educational reform was characterized by a high-stakes, performance-based testing system called the Kentucky Instructional Results Information System (KIRIS), which was linked to standards. The state also provided extensive professional development and support through a network of regional and local organizations. Kentucky was one of the first states to adopt this approach, and it had been in place for five or six years at the time the RAND and CU-Boulder researchers studied it.

The research found that Kentucky's education reform influenced classroom practices in both elementary and middle schools. The study found evidence of increased professional development related to the tests and standards and increased attention to the areas of mathematics emphasized by the standards (e.g., problem solving and mathematical communication). Researchers found no associations between particular teaching practices and increased KIRIS scores.

However, Kentucky teachers appeared to focus more on the tests than on the standards the tests were supposed to represent. Teachers reallocated instructional time to subjects tested by KIRIS; curriculum coverage varied significantly from one grade to the next in parallel with the subject matter emphasis of KIRIS. For example, students in fourth and seventh grades received more instruction in reading, writing, and science (the subjects tested at grades 4 and 7), while students in fifth and eighth grade received more instruction in mathematics, social studies, and arts/humanities (the subjects tested at grades 5 and 8). Similar shifts in emphasis occurred within specific subject areas. For example, the KIRIS writing test focuses on short written pieces, and teachers emphasized that type of writing at the expense of other types of writing.


Surveys of Washington Principals and Teachers
• Representative sample of elementary and middle schools
- 70 elementary schools, 70 middle schools
- All principals in sampled schools
- 180 fourth grade teachers
- 220 seventh grade teachers of writing or mathematics
• Administered in Spring 1999
• Response rate: 77 percent of principals, 75 percent of fourth grade teachers, 65 percent of seventh grade teachers
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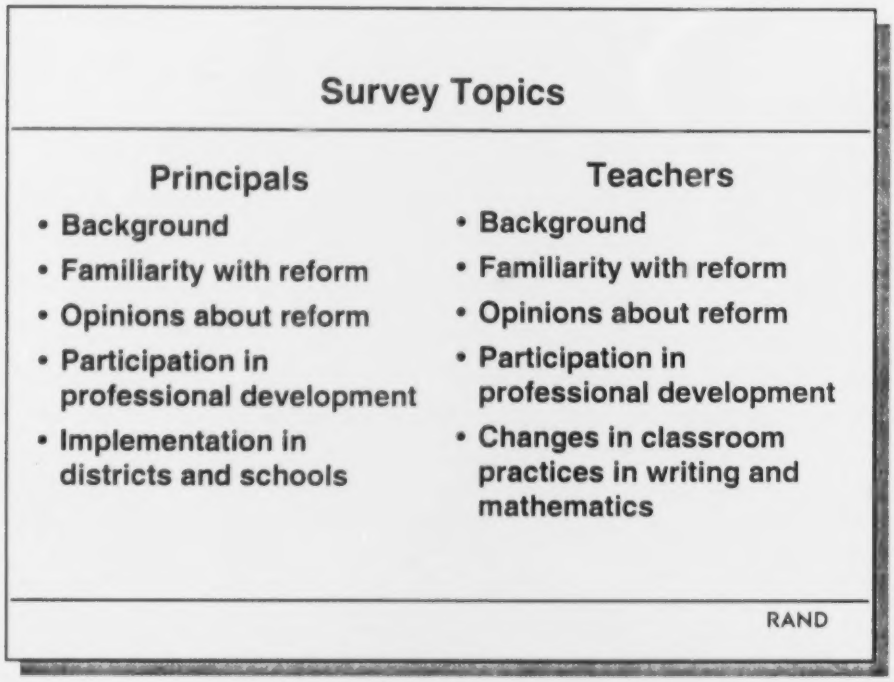
The survey of Washington educators was distributed to a stratified random sample of 70 elementary and 70 middle schools in Washington state in spring 1999, prior to the annual administration of WASL. The schools in the sample resembled the state in terms of student demographics and previous WASL scores, so findings from this study should generalize to the state as a whole.

Surveys were mailed to all principals in the sampled schools and to teachers who taught mathematics and/or writing in the WASL-tested grades (fourth grade and seventh grade). Surveys were distributed to 180 fourth grade teachers and 220 seventh grade teachers. Along with the survey, teachers received a $10 gift certificate that could be used to purchase books or materials.

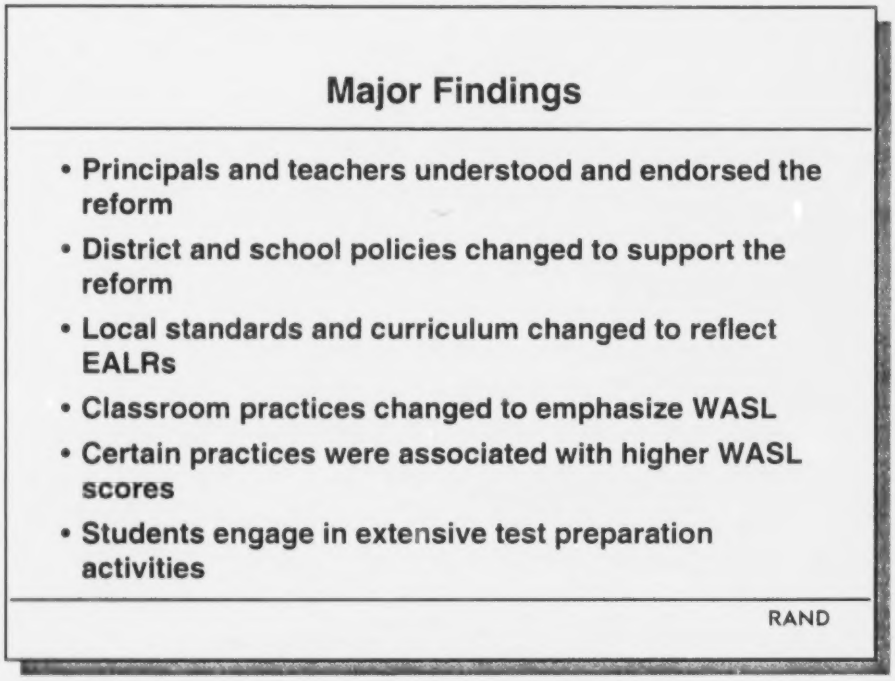
Survey response rates were high for both groups. Seventy-seven percent of principals returned completed surveys. Seventy-five percent of fourth grade teachers and 65 percent of seventh grade teachers also completed their surveys.

Those principals and teachers who responded were representative of principals and teachers in the state as a whole. The median number of years of service as principal was seven for elementary school principals who responded to the survey and nine for middle school principals. The median tenure as principal at their current school was three years for both elementary and middle school principals. The median elementary teacher who responded to the survey had 17 years of teaching experience, with seven of these at his/her current school. The median middle school teacher had nine years of experience, four at his/her current school. About one-half of the teacher respondents had master's degrees.



The principal and teacher surveys covered a range of issues related to the Washington education reform. Both principals and teachers were asked about their own educational background. In addition, they responded to questions about the professional development they received, their familiarity with the education reform, and their opinions about it. Both groups were also asked about educational practices in their schools and about changes that had occurred since 1997–98.

Specifically, principals responded to questions about policy changes at the district and school levels, while teachers were asked about specific changes in their classroom practices. Teacher questions included their allocation of time to different subjects, the topics they emphasized in mathematics and writing, and their teaching strategies. Teachers also rated the influence of different elements of the state reform on their classroom practices. All the findings relating to school and classroom practices and principal and teacher opinions are based on self-reported responses to these surveys.


Major Findings
• Principals and teachers understood and endorsed the reform
• District and school policies changed to support the reform
• Local standards and curriculum changed to reflect EALRs
• Classroom practices changed to emphasize WASL
• Certain practices were associated with higher WASL scores
• Students engage in extensive test preparation activities
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The surveys revealed a picture of schools in transition, with many changes occurring widely, but not uniformly, across the state. Briefly, the study found that principals and teachers in Washington spent a great deal of time learning about the reform, and they believed they understood its key components well. For example, they believed the standards are appropriate and attainable.

A variety of changes occurred as a result of the reform. At the district level, districts took steps to align curriculum and assessment with the EALRs. Schools and teachers also worked to make their programs consistent with the direction set by the state. Teachers changed classroom curriculum and instruction in response to the reform. In general, classroom changes appeared to be consistent with the EALRs, but local educators appeared to be responding more strongly to the highly visible WASL scores than to the EALRs. For example, teachers shifted their emphasis in the classroom to the WASL-tested subjects.

Researchers found that a school's WASL scores were positively related to teachers' knowledge of WASL and the alignment of the school's curriculum with the EALRs. They also found that teachers engaged in test preparation activities that they believed were largely responsible for WASL score gains. These two points illustrate some of the questions the study raises about the meaning of WASL scores and score gains.

The findings will be elaborated in subsequent slides.

Principals and Teachers Understood and Endorsed the Reform

- **Received 50-80 hours of professional development (in two years), about one-half related to reform**
- **More than one-half of principals and teachers**
  - **Served on district and school committees implementing the reform**
  - **Believed they understood EALRs and WASL**
  - **Believed the reform goals and EALRs were appropriate**
- **Principals were more optimistic about the reform than teachers**

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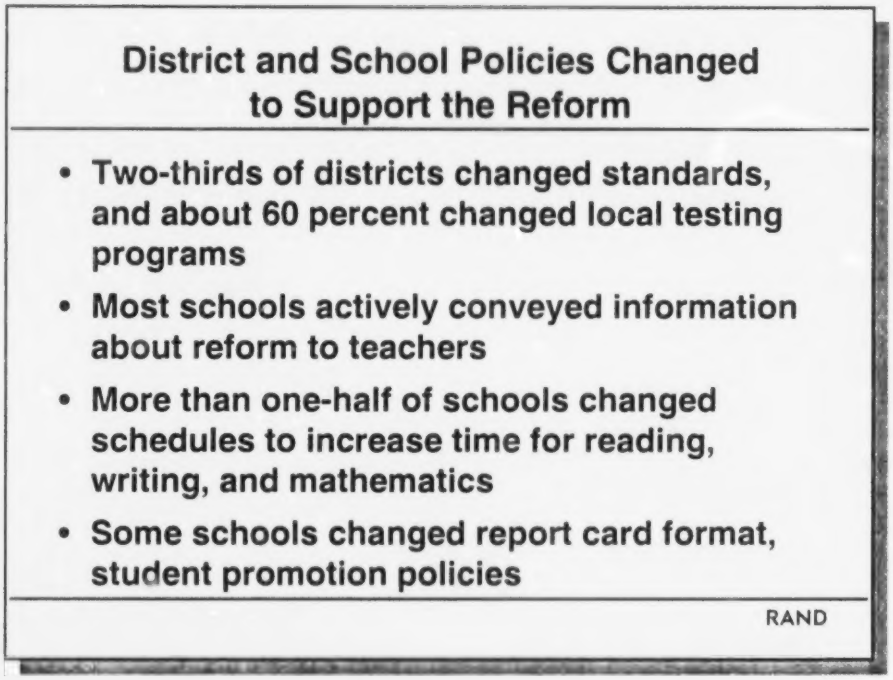
Principals and teachers spent considerable time learning about the reform during the past two years. The median number of hours principals spent in in-service training or formal professional development during the past two years was 80 hours, and one-half or more of this time was related to the reform. Similarly, the median number of hours teachers participated in in-service training or formal professional development was 50 hours, and one-half was related to the reform. This translates into three to five days of professional development per year.

Many principals and teachers also served on district or school committees working on standards, curriculum alignment with standards, or classroom-based assessment materials, which contributed to their understanding of the reform. As a result, more than three-quarters of principals and one-half of teachers indicated that they understood the reform somewhat well or very well. Furthermore, both groups endorsed key elements of the reform. Three-quarters of principals and one-half of teachers agreed that the EALRs were appropriate for benchmark grade levels and the goals of the reform were attainable.

However, principals were somewhat more enthusiastic about the reform than teachers. For example, 87 percent of elementary principals but only 61 percent of fourth grade teachers believed EALRs were appropriate. Similarly, principals were much more optimistic than teachers about the status of implementation. More principals than teachers agreed that curriculum in their schools was aligned with the EALRs and that each of the components of reform promoted better instruction and increased student learning. (The differences ranged from 10 to 20 percentage points.)

There are a number of possible explanations for these differences of opinion. They may reflect the fact that the reform is being implemented in a top-down manner, and principals are coming to understand and endorse it first. They may reflect the reluctance of teachers to change classroom practices. Or they may reflect teachers' clearer understanding of the demands of the reform at the classroom level.


District and School Policies Changed to Support the Reform
• Two-thirds of districts changed standards, and about 60 percent changed local testing programs
• Most schools actively conveyed information about reform to teachers
• More than one-half of schools changed schedules to increase time for reading, writing, and mathematics
• Some schools changed report card format, student promotion policies
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Most districts and schools made changes to support the state reform. Many districts changed their standards to coordinate local expectations of what students should know and be able to do with the state's expectations, as articulated in the EALRs. The extent to which local and state standards are coordinated, communicating the same message about reform goals, expectations of students, and student achievement, is often referred to as "alignment." Alignment of local standards and school curriculum with state reforms is a common early step in reform.

Almost all districts took actions to adopt or revise their local curriculum standards after the EALRs were developed. More than one-half of districts also changed local testing programs—adding new tests or changing the content or grades tested to align with the state reform. Few districts eliminated any local testing. As a result, the total amount of testing rose in both elementary and middle schools.

Schools responded to the WASL in a number of ways. For example, all elementary schools and almost all middle schools organized meetings of teachers and staff to share information about WASL. Almost all schools also offered professional development opportunities that focused on WASL-related issues.

Many schools also made more-fundamental changes to their organization or policies. About one-half of the schools changed schedules to increase or focus time on tested subjects. Some schools also changed their report card formats or student promotion policies. Some schools offered explicit incentives for students to do well on WASL, including parties and field trips.

District Standards Changed to Reflect EALRs, Particularly in Tested Subjects

Subjects	Elementary School	Middle School
Reading	**94**	**96**
Writing	**94**	**98**
Mathematics	**93**	**90**
Communication/Listening	**83**	**83**
Social Studies	65	61
Science	67	76
Arts	56	61
Health and Fitness	56	56

Percent of principals indicating district standards are somewhat well or very well aligned with EALRs

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The surveys asked principal "how well" their district standards or school curriculum aligned with EALRs, and most principals believed that their district's standards were aligned with the EALRs and with the WASL tests. As the first three rows of the table illustrate, more than 90 percent of principals in elementary schools and middle schools reported their districts standards to be somewhat or very well aligned with the EALRs in reading, writing, and mathematics. Over 80 percent of principals thought their district's assessments were aligned with WASL in communication and listening, as well. In contrast, a lower percentage of principals felt their district's standards were aligned with the EALRs in subjects not currently tested by WASL.

School Curriculum Was Aligned with EALRs, Particularly in Tested Subjects

Subject	Elementary School		Middle School	
	Principals	Teachers	Principals	Teachers
Reading	**100**	**82**	**96**	**96**
Writing	**98**	**89**	**100**	**93**
Mathematics	**94**	**81**	**90**	**81**
Communication/Listening	**77**	**62**	**85**	**90**
Social Studies	64	52	64	75
Science	68	52	79	--
Arts	51	35	60	--
Health and Fitness	57	37	65	--

Percent of principals and teachers indicating school curriculum is somewhat well or very well aligned with EALRs

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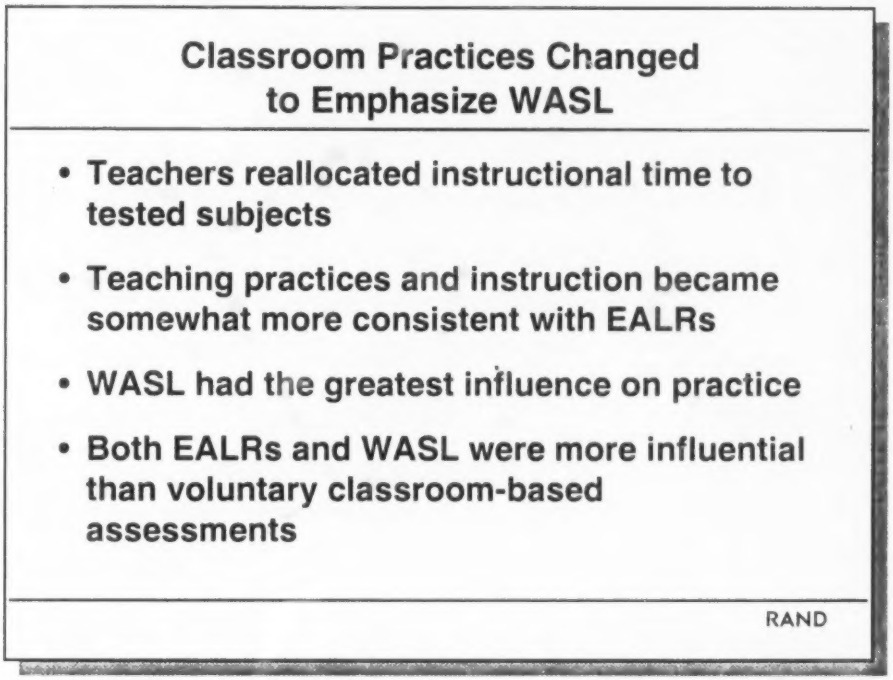
Over 80 percent of principals and teachers reported that their school curriculum was aligned with the EALRs in the WASL-tested subjects (with the exception of communication/listening). This table shows both groups' perceptions of alignment across the different subjects.

Principals were more certain than teachers that curriculum aligned with EALRs in the WASL-tested subjects. The percentage of both principals and teachers reporting alignment was lower in subjects not tested by WASL—social studies, science, arts, and health/fitness—than in subjects tested by WASL.

Teachers also reported that their curriculum materials were aligned with the EALRs. In writing, for example, slightly more than one-half of the fourth grade teachers and about three-quarters of the seventh grade writing teachers indicated that they used a writing or language arts textbook. Approximately 29 percent of these teachers thought their textbook was very well aligned with the EALRs in their subject.


Classroom Practices Changed to Emphasize WASL
• Teachers reallocated instructional time to tested subjects
• Teaching practices and instruction became somewhat more consistent with EALRs
• WASL had the greatest influence on practice
• Both EALRs and WASL were more influential than voluntary classroom-based assessments
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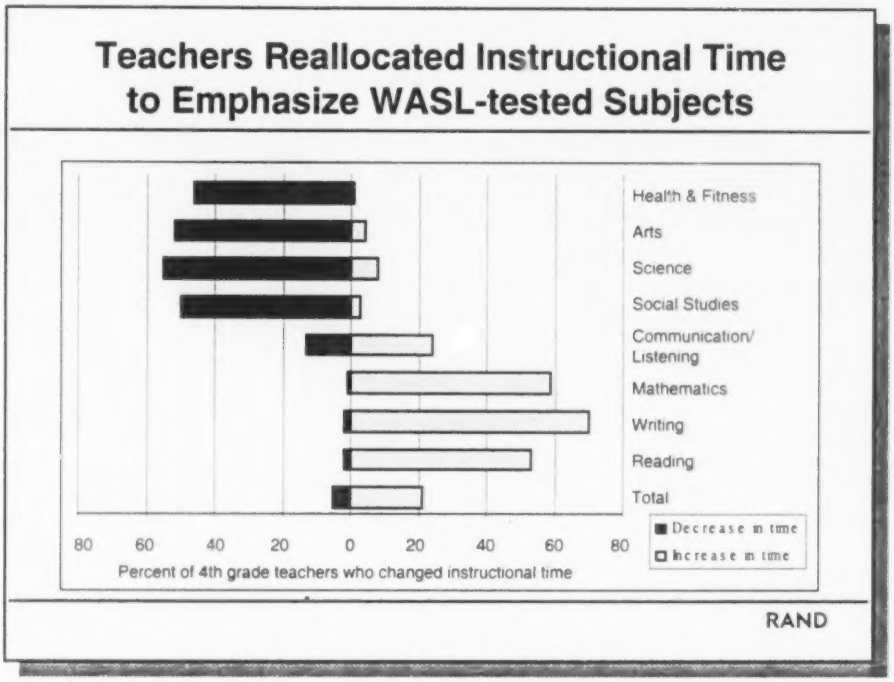
Teachers have changed their curriculum and instruction since the introduction of Washington education reform. Changes occurred in the allocation of classroom time, curriculum content, and teaching methods. For example, teachers and schools reallocated instructional time to emphasize subjects tested by WASL at the expense of subjects not tested by WASL. Similarly, teachers and principals reported that curriculum and instruction are more aligned in tested subjects than in non-tested subjects.

In general, changes in curriculum and instruction appeared to be consistent with the EALRs. For example, teachers increased their attention to different genres in writing; something that was not common prior to the introduction of the EALRs. However, local educators appeared to respond most to the highly visible WASL tests. For example, teachers increased the use of rubrics in writing and extended-response items in mathematics, both of which are prominent features of the tests.

Finally, we found that not all aspects of the reform were equally salient to teachers. Classroom-based assessment, in particular, was not as widely understood or as influential as the EALRs or WASL.



The most dramatic change in classroom practices was the reallocation of instructional time. Fourth grade teachers, who teach all subjects, reported marked decreases in time spent on subjects not included in the WASL and marked increases in subjects tested by the WASL. Also, about 20 percent of teachers indicated that overall instructional time had increased.

These reports are similar to the findings in Kentucky, where teachers spent more time on tested subjects at the expense of non-tested subjects. As noted previously, surveys of Kentucky teachers revealed that curriculum coverage varied significantly from one grade to the next in parallel with the subject matter emphasis of KIRIS.

The shift in instructional time toward tested subjects may decline as Washington introduces WASL tests in science, social studies, arts, and health/fitness over the next seven years. However, the state plans to introduce these tests in grades other than the benchmark grades at the elementary and middle school levels. Splitting the WASL tests between two grades distributes the testing burden among grade levels. However, it also creates an incentive for teachers to focus their instruction on the tested subjects at the expense of non-tested subjects; thus the additional grades tested may also suffer from reallocations of instructional time to emphasize the tested subjects.

Writing Curriculum Emphasized the "Writing Process," but Genre Increased Most

Selected Aspects of Writing	Covered Aspect Daily or Weekly		Increased Coverage During Past 2 Years	
	Grade 4	Grade 7	Grade 4	Grade 7
Application of writing conventions	86	83	37	46
Writing process: draft	73	65	34	35
Writing process: edit	68	57	36	32
Genre: style appropriate to audience and purpose	42	32	51	60
Genre: write for different audiences	28	22	43	53

Percent of teachers

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This slide illustrates two things: the frequency of coverage of different elements of the writing curriculum, and the change in frequency during the past two years. Looking first at coverage, we found that the content of the writing curriculum was broadly reflective of the EALRs in both the fourth and seventh grades. Eleven of the 14 writing behaviors specified in the EALRs were covered weekly or more often by over 40 percent of the teachers at both grade levels. However, as shown in this slide, teachers concentrated classroom time more on writing conventions and on the writing process than on the other elements of the EALRs. (Note: the slide contains only a selected subset of the items on the survey.)

In response to a general question about change, most writing teachers in the fourth and seventh grades reported that they changed the overall content of their writing lessons and their teaching methods during the last two years. At the fourth grade level, 42 percent of teachers reported a great deal of change, and 81 percent of teachers reported making at least a moderate amount of change. Fewer seventh grade writing teachers made changes: 29 percent reported a great deal of change and 55 percent reported at least a moderate amount of change.

More specifically, the greatest percentage of teachers increased coverage of the less-traditional topics. Roughly one-half of the teachers in both grades reported increasing their coverage of different audiences, purposes, and forms of writing, as well as the application of styles appropriate to different audiences and purposes.

Thus, the writing content most frequently taught remained unchanged over time while teachers increased the frequency with which they taught the other content areas. Content most frequently taught might be considered more "traditional" while the other content appears to be more "reform-oriented."

Writing Instruction Emphasized Mechanics, but Rubric-based Instruction Increased Most

Writing Instructional Strategy	Used Teaching Strategy Daily or Weekly		Increased Use During Past 2 Years	
	Grade 4	Grade 7	Grade 4	Grade 7
Read orally to students	97	76	13	30
Explain correct usage of grammar, spelling, punctuation, and syntax	90	86	20	46
Teach Six-Trait or other rubric-based approach to writing	64	41	56	61
Provide time for unstructured ("free") writing	53	40	14	25
Comment on student writing in terms of WASL rubrics	30	31	62	69

Percent of teachers

RAND

This slide illustrates two things: the frequency that teachers used different writing instructional strategies, and the change in frequency during the past two years. On the survey, teachers reported the frequency with which they used 15 different instructional strategies ranging from fairly traditional techniques, for example, "read orally to students," to more innovative approaches, for example, "write with students on the same assignment." Responses to a subset of five of these strategies are summarized here. Most teachers in both grades read to students at least once a week and taught language mechanics (grammar, spelling, punctuation and syntax) as frequently.

However, the area of greatest change in writing instruction was teachers' use of rubrics. More than one-half of teachers increased the frequency with which they comment on student writing in terms of WASL rubrics and their use of Six-Trait or other rubric-based approaches to writing.

Mathematics Curriculum Emphasized Number Sense, but Probability and Statistics Increased Most

Mathematics Content Area (from EALRs)	Covered Aspect Daily or Weekly		Increased Coverage During Past 2 Years	
	Grade 4	Grade 7	Grade 4	Grade 7
1.1 Number Sense	76	79	29	29
1.2 Algebraic Sense	30	53	31	37
1.3 Measurement	29	21	28	18
1.4 Geometric Sense	27	20	32	35
1.5 Probability and Statistics	17	16	40	52

Percent of teachers

RAND

Teachers' descriptions of their mathematics curriculum and teaching strategies revealed a picture similar to writing, although not quite as dramatic. This slide shows curriculum coverage; the next slide shows teaching methods.

Of the five major content areas of mathematics, number sense was covered at least weekly by the greatest percentage of teachers. In contrast, probability and statistics was covered weekly by the lowest percentage of teachers.

Mathematics content has not changed as much as writing content in the past two years. With one exception, only about one-third of the teachers reported increasing coverage of any of the five topics. The exception was in the area of probability and statistics; about one-half of the mathematics teachers increased their coverage of this topic during the past two years. In addition, more fourth grade than seventh grade teachers increased their coverage of measurement, while more seventh grade teachers than fourth grade teachers increased their coverage of probability and statistics.

Mathematics Instruction Included Many Strategies, but Open-Response Questions Increased Most

Mathematics Teaching Strategy	Used Teaching Strategy Daily or Weekly		Increased Use During Past 2 Years	
	Grade 4	Grade 7	Grade 4	Grade 7
Explain correct solutions	91	90	30	12
Demonstrate new skill	81	81	26	22
Assess students' mathematics skills	73	76	29	19
Give examples of real-life applications	76	73	47	44
Ask open-response questions with many right answers	83	72	65	58
Demonstrate mathematical ideas using constructions, manipulatives, etc.	61	33	41	18
Conduct speed drills	54	12	14	6

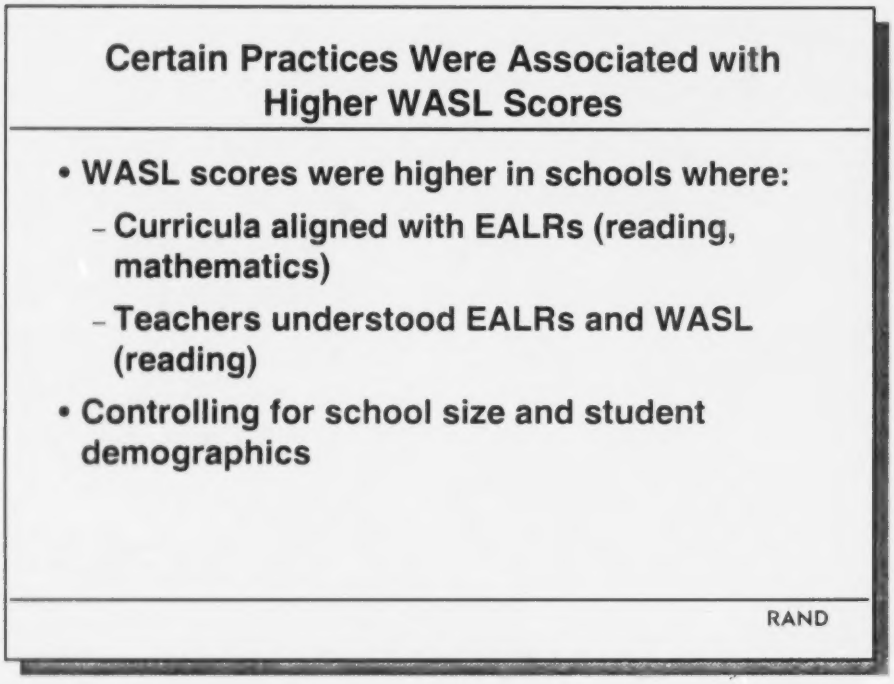
Percent of teachers

RAND

Most mathematics teachers used a range of instructional strategies on a regular basis. More than 70 percent of mathematics teachers in grades four and seven explained new concepts, demonstrated new skills, assessed student skills, gave examples of real-life applications, and asked open-response questions at least weekly.

Fewer teachers regularly conducted speed drills or used manipulatives, particularly in middle school. Only 12 percent of seventh grade mathematics teachers used speed drills regularly. In fact, some teachers, including 29 percent of seventh grade teachers, reported that they never used speed drills. Similarly, only one-third of seventh grade mathematics teachers had students demonstrate their mathematical skills using manipulatives at least weekly.

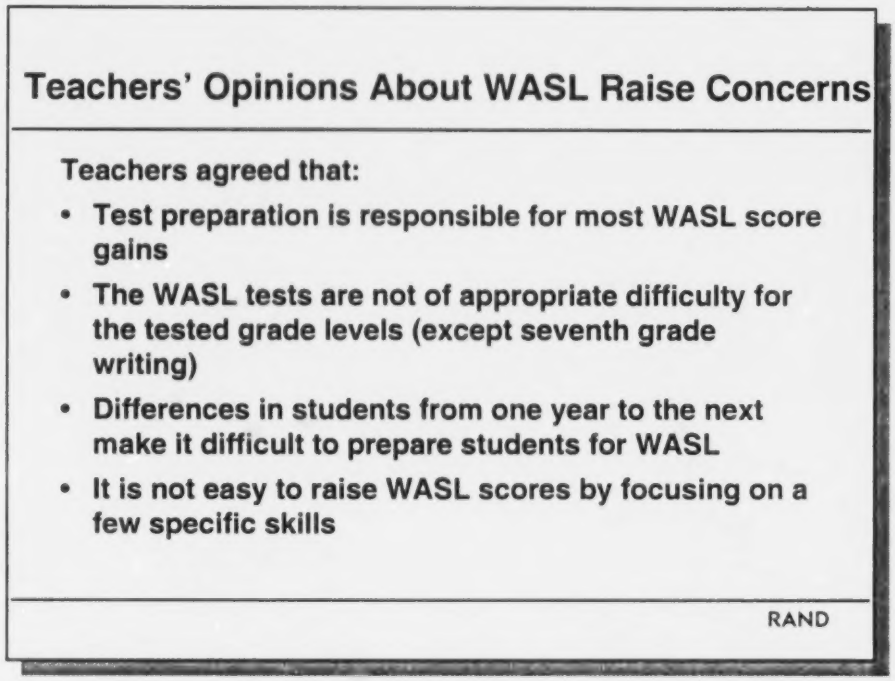
The influence of the education reform may be seen in the changes teachers made in their mathematics teaching strategies. More than one-half of teachers asked more open-response questions with many right answers. Also, more than 40 percent of teachers increased their use of examples of real-life applications of mathematics. A related finding (not reported on this slide) was that 22 percent of mathematics teachers decreased their use of speed drills.


Certain Practices Were Associated with Higher WASL Scores
• WASL scores were higher in schools where:
– Curricula aligned with EALRs (reading, mathematics)
– Teachers understood EALRs and WASL (reading)
• Controlling for school size and student demographics
RAND

The researchers used a statistical technique called regression analysis to investigate the relationships between WASL scores and survey responses, while also accounting for differences in school size and student demographics. Researchers examined selected items from the principal and teacher surveys related to curriculum alignment, teacher understanding, school policies and actions in support of the reform, and test preparation. They compared responses to these items to schools' WASL scores.

There was a statistically significant positive relationship between WASL scores and curriculum alignment. Schools where principals and teachers judged curriculum to be more aligned with the EALRs had higher WASL scores in reading, mathematics, and listening than schools whose curriculum was judged to be less aligned with the EALRs. Schools where teachers reported more understanding of the EALRs and WASL had higher WASL scores in mathematics, (and marginally higher scores in reading) than schools where teachers reported less understanding of the EALRs.

These results are noteworthy because it is unusual to find such relationships when using school average scores and school average survey responses. They suggest that alignment is more than just a "catch-phrase" but an important element in responding to the Washington education reform.


Teachers' Opinions About WASL Raise Concerns
Teachers agreed that:
• Test preparation is responsible for most WASL score gains
• The WASL tests are not of appropriate difficulty for the tested grade levels (except seventh grade writing)
• Differences in students from one year to the next make it difficult to prepare students for WASL
• It is not easy to raise WASL scores by focusing on a few specific skills
RAND

On the survey, teachers were asked to agree or disagree with a number of statements about the education reform; four of these statements were directly related to the WASL test. Teachers' responses to these items raise some concerns about the meaningfulness of WASL scores. About three-quarters of fourth grade teachers and seventh grade mathematics teachers disagreed with the statement that the "WASL tests are of the appropriate difficulty for the tested grades." Furthermore, most teachers agreed that changes in WASL scores could be attributed to factors that were unrelated to changes in students' mastery of the standards. Specifically, teachers agreed that "better test preparation is responsible for most of the changes in WASL scores." Teachers also reported that they increased their use of sample test items and WASL-like questions in class.

On the other hand, few teachers thought they could easily influence the WASL scores, that is, "game" the test. Fewer than one-half of teachers agreed with the statement "it is easy to raise (test) scores by focusing narrowly on a few specific skills" featured on the test. More than 70 percent of teachers reported that "differences in student characteristics from year to year make it difficult to prepare students for WASL."

Increased test preparation activities raise complex questions about the meaning of the WASL results. Some types of test familiarization are quite appropriate and help students produce scores that are indicative of their broader abilities. Other types of focused preparation are quite inappropriate. By focusing narrowly on the particular content or format of the test, teachers may increase students' WASL scores without increasing their broad knowledge of the EALRs. This issue deserves continued scrutiny in the future.

Study Reveals that Implementation is Occurring, but Raises Some Concerns

- **Educators generally understood and supported the reform**
- **Changes in policy, school organization, curriculum, and teaching were consistent with the reforms**
- **WASL strongly influenced many of the changes**
- **Schools where educators reported more curriculum alignment had higher WASL scores**
- **Teachers reallocated instructional time from non-tested to tested subjects**
- **Extensive test preparation activities need further examination**

RAND

In summary, this study shows that educators responded to the Washington education reform with changes at the district, school, and classroom levels. Principals and teachers devoted considerable effort to learning about the reform and adapting school practices to support it. Principals and teachers reported that they understood and supported the reform. Districts changed standards, curriculum, and assessments to be consistent with the state reform. Similarly, teachers made modest changes in curriculum content and instructional strategies in writing and mathematics to promote the goals of the reform. WASL appeared to be the most salient influence on teachers and schools. Teachers indicated that many of their changes in the writing and mathematics curriculum and instruction mirrored the content or format of the WASL tests. Other things being equal, schools with greater curriculum alignment also had higher WASL scores in reading and mathematics.

Teachers made some changes that may be less desirable. In some cases, teachers emphasized tested material and format over equally important content not covered by state testing. For example, teachers increased the amount of instructional time spent on tested subjects at the expense of non-tested subjects. Similarly, educators reported that the alignment of local standards and curriculum with EALRs was higher in the tested subjects.

Finally, teachers spent considerable time specifically preparing students for the WASL. Such actions deserve continuing examination to ensure that they do not detract from the goals of the reform.

A follow-up survey of Washington educators was administered in spring 2000. The survey covers the same topics in order to monitor changes in the implementation of the reform. The results of the 2000 survey will be available in spring 2001.

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